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AFCRL-63-484

Infrared Atmospheric Studies

FINAL REPORT

Contract No. AF 19 (628)-301

1 November 1961 — 31 October 1962

Project No. 7670

Task No. 76703

ARTHUR ADEL

Atmospheric Research Observatory

Arizona State College

Flagstaff, Arizona

May 1963

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AIR FORCE CAMBRIDGE RESEARCH LABORATORIES  
OFFICE OF AEROSPACE RESEARCH  
UNITED STATES AIR FORCE  
BEDFORD, MASSACHUSETTS

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## Introduction

Contract No. AF 19 (628) - 301 and its predecessor contracts have produced a total of twenty scientific reports, all concerned with Infrared Atmospheric Studies, one of these under referenced numbered contract, above.

Scientific Report No. 1, Contract No. AF 19 (628) - 301, April, 1962

Two formerly unknown regions of atmospheric transmission, or "atmospheric windows", have been discovered by the writer in recent times. One of these is the micro-window at 6.3 microns, while the second is a window of major importance, which transmits extraterrestrial radiation from 16 to 24 microns.

Referenced report is concerned with extensions of the initial experiments. The resolution in the micro-window has been increased. The delineation of the transmission characteristics of the major window has been greatly improved.

The atmospheric micro-window at 6.3 microns has been examined with grating resolution. The narrow region of transmission is characterized by ten absorption lines.

The net emission of the earth's surface through the atmospheric window from 16 to 24 microns has been observationally compared with the net radiation loss through the principal window between 8 and 14 microns, and found to reach values in excess of 30 percent of the latter.

## In Preparation

One dealing with Mie Scatter near the sun, a second concerned with continuous absorption by the atmosphere between 8 and 11 microns.

<p>AF Cambridge Research Laboratories, Bedford, Mass.</p> <p>INFRARED ATMOSPHERIC STUDIES, Final Report. AFCRL-63-484, by Arthur Adel, May 1963.</p> <p>Contract No. AF19 (628)—301 and its predecessor contracts have provided a total of twenty scientific reports, all concerned with Infrared Atmospheric Studies, one of these under referenced numbered contract. The latter, dealing with the atmospheric windows at 6.3 microns and 16 to 24 microns, is summarized in Final Report AFCRL-63-484.</p>	<p>UNCLASSIFIED</p> <ol style="list-style-type: none"> <li>1. Infrared Atmospheric Studies.</li> <li>2. Atmospheric Windows.</li> </ol> <p>I. Adel, A.</p>	<p>AF Cambridge Research Laboratories, Bedford, Mass.</p> <p>INFRARED ATMOSPHERIC STUDIES, Final Report. AFCRL-63-484, by Arthur Adel, May 1963.</p> <p>Contract No. AF19 (628)—301 and its predecessor contracts have provided a total of twenty scientific reports, all concerned with Infrared Atmospheric Studies, one of these under referenced numbered contract. The latter, dealing with the atmospheric windows at 6.3 microns and 16 to 24 microns, is summarized in Final Report AFCRL-63-484.</p>	<p>UNCLASSIFIED</p> <ol style="list-style-type: none"> <li>1. Infrared Atmospheric Studies.</li> <li>2. Atmospheric Windows.</li> </ol> <p>I. Adel, A.</p>	<p>UNCLASSIFIED</p>
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